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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: :

HARALD C. SNORRE et al. :

SERIAL NO: 10/049,291 : ATTN: APPLICATION BRANCH

FILED: February 11, 2002 :

FOR: ELECTROMAGNETIC SIMULATION ALGORITHM, IN PARTICULAR FOR THE PERFORMANCE OF AN ANTENNA

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to a first examination on the merits, please amend the above-identified application as follows:

IN THE CLAIMS

Please amend the claims to read as follows:[1]

3. (Amended) The electromagnetic simulation algorithm as claimed in claim 1, characterized in that the preconditioner Z is determined implicitly.

4. (Amended) The electromagnetic simulation algorithm as claimed in claim 1, characterized in that the preconditioner Z is defined by the following relation:

$Z = {}^{t}JMJ$

where J is a matrix formulation of the operator $\boldsymbol{J}$, and ${}^{t}J$ the transposed matrix of J.

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[1]A marked-up copy of the amendment is attached hereto.

6. (Amended) The electromagnetic simulation algorithm as claimed in claim 1, characterized in that the iterative algorithm used is a fast algorithm, of the multilevel multipole method type.

7. (Amended) The electromagnetic simulation algorithm according to claim 1, characterized in that the iterative algorithm used is a fast algorithm, of the adaptive integral method type.

8. (Amended) The electromagnetic simulation algorithm as claimed in claim 1, characterized in that the body is an antenna for which one seeks to determine an optimal shape, by using the simulation algorithm in an antenna design tool.

9. (Amended) The electromagnetic simulation algorithm as claimed in claim 1, characterized in that the body is an object of known shape for which one seeks to determine the radar cross section (RCS).

IN THE ABSTRACT

Please delete the original Abstract on page 27 in its entirety and insert therefor:

ABSTRACT

An electromagnetic simulation algorithm to compute the electromagnetic wave scattered by a conductor in a monofrequency situation. The electromagnetic simulation algorithm is based on an iterative solution of a system of integral equations including a preconditioner. The preconditioner arises in particular from adapting Calderon's formulae to the boundary integral equations of electromagnetism, also known as the Electric Field Integral Equation (EFIE). Use is also made of an original representation of the residual of the computations during each iteration. This representation, as well as a projection and a

composition, are involved in the expression of the preconditioner. Such an algorithm may find application to simulation tools used during the design of reception or transmission antennas such as cellphone antennas, anti-collision radar antennas, those of electronic counter measures (ECM) systems, of monitoring or tracking radars, or satellite antennas. The algorithm can also be applied to the computation of radar cross sections (RCS) of objects whose geometrical properties are known.

REMARKS

Favorable consideration of this application, in view of the following comments and as presently amended, is respectfully requested.

The present preliminary amendment is submitted to place the above-identified application in more proper format under United States practice.

By the present preliminary amendment the claims are amended to no longer recite any improper multiple dependencies.

A new Abstract believed to be in more proper format under United States practice is also submitted herein.

The present application is believed to be in condition for a full and thorough examination on the merits. An early and favorable consideration of the present application is hereby respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Surinder Sachar

Gregory J. Maier
Registration No. 25,599
Attorney of Record
Surinder Sachar
Registration No. 34,423

22850

(703) 413-3000
Fax #: (703)413-2220
GJM:SNS/smi

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Marked-Up Copy
Serial No:
10/049,291
Amendment Filed on:
5-31-2002

IN THE CLAIMS

Please amend the claims as follows:

--3. (Amended) The electromagnetic simulation algorithm as claimed in [one of the preceding claims] claim 1, characterized in that the preconditioner Z is determined implicitly.

4. (Amended) The electromagnetic simulation algorithm as claimed in [one of the preceding claims] claim 1, characterized in that the preconditioner Z is defined by the following relation:

$Z = {}^{t}JMJ$

where J is a matrix formulation of the operator $\boldsymbol{J}$, and ${}^{t}J$ the transposed matrix of J.

6. (Amended) The electromagnetic simulation algorithm as claimed in [one of the preceding claims] claim 1, characterized in that the iterative algorithm used is a fast algorithm, of the multilevel multipole method type.

7. (Amended) The electromagnetic simulation algorithm according to [one of claims 1 to 5] claim 1, characterized in that the iterative algorithm used is a fast algorithm, of the adaptive integral method [method] type.

8. (Amended) The electromagnetic simulation algorithm as claimed in [one of the preceding claims] claim 1, characterized in that the body is an antenna for which one seeks to determine an optimal shape, by using the simulation algorithm in an antenna design tool.

9. (Amended) The electromagnetic simulation algorithm as claimed in [one of claims 1 to 7] claim 1, characterized in that the body is an object of known shape for which one seeks to determine the radar cross section (RCS).--

IN THE ABSTRACT

(New).